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PATENT SPECIFICATION

Application Date: Aug. 7, 1942. No. 11082/42. **558,239**
„ „ Sept. 2, 1942. No. 12414/42.

One Complete Specification left (under Section 16 of the Patents and Designs Acts, 1907 to 1942): Jan. 25, 1943.

Specification Accepted: Dec. 28, 1943.

PROVISIONAL SPECIFICATION
No. 11082, A.D. 1942.

Improvements relating to Concrete Structures

I, LESLIE SHINGLETON, a British Subject, of Killarney, The Holt, Binsted, Hampshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to concrete structures, and it has for its object to provide a method of construction which will avoid the necessity of shuttering as commonly understood. A further object is to enable concrete walls, floors and the like to be constructed with the use of tubular scaffolding as the supporting structure.

According to this invention slabs of reinforced concrete, which may be of standard dimensions, are formed with holes adjacent the corners to receive bolts or other means of fastening, and these slabs are assembled with suitable supports from the tubular scaffolding to form a shuttering which will become united with the concrete when filled in, so as to form the facing of the wall, floor, or other structure.

It is convenient to employ slabs of a standard size, say four feet long and two feet wide, and to mould bolt holes in these slabs near each corner, say three inches from the sides. Each slab should be of sufficient thickness to give it the necessary strength, a convenient thickness being 1.5 inch. The slabs are moulded in a machine or by hand with reinforcement of wire mesh or any other suitable reinforcing material, and preferably with a few hooks, loops or the like attached to the reinforcement and projecting from the surface of each slab for embedding in the concrete filling at a later stage.

For securing the slabs together at the corners metal plates are provided with means for supporting them from the tubular scaffolding and with slots in them suitably placed to receive bolts or pins which will engage with the holes formed in the concrete slabs. Metal plates nine inches square are suitable, with slots near the corners to receive the bolts or the like for engaging in the holes in the slabs. The centre of each plate is provided with a projecting stem which may be screw-threaded for example for engagement by a right-and-left threaded screw coupler, the other end of which screws on the end of a strut supported by a clamp on one of the tubes of the scaffolding. In making up the shuttering the concrete slabs are laid in rows and bolted together at the corners to the plates which are strutted to the tubular scaffolding by the screw couplers which enable the shuttering to be adjusted accurately in position. In building a wall, scaffolding is provided both inside and outside and the slabs are supported from the scaffolding at each side so as to leave the requisite space between the slabs for the concrete filling. For example in making a fourteen inch wall with the use of slabs one and a half inches thick, the slabs are set up so as to leave a space eleven inches wide between them. Three rows or tiers of the slabs may be laid both inside and outside the wall structure and adjusted by the screw couplers against inserted distance pieces to give the correct spacing. The concrete is then filled in to occupy the space between the slabs and, when set, to unite the slabs with the concrete in a unitary structure. The slabs may be moulded with a roughened surface, although this is not essential, but hooks, loops or the like projecting from the reinforcement are desirable, as already described, so as to form a lock between the slabs of the shuttering and the concrete filling. The edges of the slabs may be square so that they rest one upon another to form butt joints, or they can be stepped or bevelled or otherwise shaped to permit the concrete to enter the joint line to some extent if required. When the concrete has set the screw couplers can be released, and the bolts holding the plates to the corners of the slabs can be withdrawn, leaving the slabs as a facing for the concrete structure.

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If screw bolts are used to hold the corners of the slabs to the plates, they will engage with nuts on the inside of the slabs, and these nuts will be left behind in the concrete when the bolts are withdrawn. As the nuts are not required to withstand any substantial stresses they can be made of fibre or the like if preferred, and of course washers can be provided under the nuts which will also be left behind. The plates in which the nuts engage preferably have the slots in them elongated in one direction so as to allow for a certain amount of latitude for bolting if the plates when strutted from the scaffolding are not accurately in line with the holes in the slabs. Instead of screw bolts, split pins can be used with wedges for extending them, or any other means of securing the concrete slabs to the corner plates.

The adjustable struts which support the metal plates joining the corners of the slabs and hold them in position may bear against either uprights or horizontal tubes of the scaffolding, and the struts, plates and bolts can be used over again for successive tiers in the structure as one tier is completed and the next is to be added with its shuttering slabs and its concrete filling. Where a wall, floor or the like is completed by the method of this invention, the joints between the slabs can be pointed or the whole surface can be covered with plaster, rough-cast or the like according to the finish desired.

It is well known of course to build up walls of concrete blocks laid on one another inside and outside, with or without ties between them, and to fill the intervening space with concrete. The present invention differs from this in that comparatively thin slabs are used, each forming a substantial area of the wall surface and requiring external support to maintain it in position and with the proper spacing between the slabs at the two sides of the wall or the like. The slabs in fact act like shuttering rather than as moulded blocks, but the shuttering forms a permanent part of the structure in this case. As the slabs are themselves reinforced internally they add strength to the structure as a whole. Of course additional reinforcement may be introduced in the space between the slabs at the two sides of the wall if this is required.

Instead of supporting the plates from the tubular scaffolding by screw couplers they can be connected to the tubes in any other convenient way which permits of accurate setting and adjustment. Although rectangular metal plates have been described for supporting purposes with slots near to each corner for receiving the bolts which pass through the holes in the slabs, it will be understood that the plates may be in the form of discs with the necessary spaced holes, or any other form which enables the corners of the slabs to be supported and the bolts or the like to be secured in position. Slabs in successive tiers can be laid so as to break joint, and slabs of varying lengths can be used to permit of this. At the corners of a structure slabs with two faces at right angles can be used to maintain continuity of the surface at the corners.

Dated this 7th day of August, 1942.
For the Applicant:
GILL, JENNINGS & EVERY,
Chartered Patent Agents,
51/52, Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION
No. 12414, A.D. 1942.

Improvements relating to Concrete Structures

I, LESLIE SHINGLETON, a British Subject, of Killarney, The Holt, Binsted, Hampshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to concrete structures, and it has for its object to provide a method of construction which will avoid the necessity of shuttering as commonly understood. A further object is to enable concrete walls, floors and the like to be constructed with the use of tubular scaffolding as the supporting structure.

The invention comprises further improvements upon the invention set forth in my patent application No. 11082/42, designed with the object of simplifying and improving the construction.

The metal plates used for securing the corners of the slabs together are preferably formed with a raised or projecting portion at the centre which may be made by a stamping operation to accommodate the head of the screwed rod or projecting stem forming part of the strut. The raised portion of the plate

may be slotted so as to allow the plate to be adjusted transversely with respect to the strut so as to allow for displacement between the tubular scaffolding and the joint lines between the concrete slabs. In place of a right-and-lefthand screw coupler any other adjustable form of strut may be used which will enable the slabs to be set up and aligned accurately in relation to the scaffolding.

For locating the slabs in relation to the metal plates, I prefer to insert screwed studs into the holes near the corners of each metal plate, these studs serving merely as a means of location. I then arrange distance-and-tie rods between the concrete slabs to space them correctly apart before the filling is effected and to act as ties after the filling. The rods used have collars formed, screwed or shrunk on them near to each end at the correct distance apart for the space between the slabs at the inside and outside of the wall, and the projecting ends of the rods may be made irregular or ragged so as to grip the concrete. The screwed studs then only protect part way through the slabs, leaving room for the ragged ends of the rods, and when the metal plates are removed the holes are plugged or filled in with concrete to grip the ragged ends.

It is possible to build a wall according to this invention with scaffolding on one side only. In this case the screw studs in the metal plates are drilled out internally to screw upon threaded ends of the distance-and-tie rods. The studs are then screwed back when placing the slabs in position, the distance-and-tie rods are introduced between the slabs, and the studs are screwed in again through the metal plates and into engagement with the threaded ends of the tie rods. In this way the tie rods are secured to the metal plates at the back and front of the wall surface and there is no need for internal scaffolding to hold up the plates at the inside. Access can be given to them by staging, tressles or the like at the inside surface. When the concrete has been filled in between the slabs the screw studs can be screwed back until their ends are flush with the inner surface of the metal plates, by which time they will have ceased to engage the ends of the tie rods. The metal plates are then removed and the stud holes are filled in or plugged with concrete.

Any other convenient means of securing the plates to the ends of the tie rods on the inner surface of the wall may be used, and the screw studs have been mentioned only by way of example.

When the slabs are to be secured to a steel structure for forming a floor, the wire mesh reinforcement may be made to project from the slabs near to each end so that it can be wrapped over the flanges of the steel joists in the floor structure, and when a concrete filling is laid on the slabs, this reinforcement will serve to bond it with the slabs at the feet of the joists.

Where the slabs are to be applied to a reinforced concrete floor they may be provided with wire hooks or the like projecting on the inner face to hook over reinforcing rods arranged in the position where the floor is to be laid. Otherwise, slabs such as are described for use in the wall structures will serve equally well for floor and roof construction, rendering the use of shuttering unnecessary. The slabs are strutted from the scaffolding by plates arranged at the corners of the slabs, and no inserted tie rods or distance pieces are needed for the floor construction.

For forming door and window openings pre-cast concrete units of convenient sizes and shapes are used, bonded to the wall slabs or concrete filling if desired and inserted before the concrete filling is introduced.

After each run of the wall has been completed, the screw couplers or struts are removed, together with the metal plates, and are used for securing the slabs in the next higher run of the wall, the holes left by the locating bolts being filled in with concrete or other filling. The distance-and-tie rods form a permanent part of the structure reinforcing the wall transversely. When two of the studs on a metal plate are not required, as at angles and window openings in the structure, all that is necessary is to screw back the studs until their ends are flush with the face of the metal plate.

When pipes or flues are to be formed in the walls, lengths of metal or stoneware piping can be introduced between holes in the slabs before the concrete is filled in, and smoke flues of terra-cotta or the like can similarly be embedded in the concrete. Ventilator gratings can be cast in the slabs and openings left between them in the walls by insertion of suitable pre-formed box-like blocks before filling in the concrete.

Dated this 2nd day of September, 1942.

For the Applicant:
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COMPLETE SPECIFICATION

Improvements relating to Concrete Structures

I, LESLIE SHINGLETON, a British Subject, of Killarney, The Holt, Binsted, Hampshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to concrete structures, and it has for its object to provide a method of construction which will avoid the necessity of shuttering as commonly understood. A further object is to enable concrete walls, floors and the like to be constructed with the use of tubular scaffolding as the supporting structure.

According to this invention thin slabs of reinforced concrete, which may be of standard dimensions, are formed with holes adjacent the corners to receive bolts or other means for locating them, and these slabs are assembled with supporting plates adjustably mounted upon the tubular scaffolding so as to form a shuttering which will become united with the concrete when filled in, and will form the facing of the wall, floor, or other structure.

It is convenient to employ, as far as possible, slabs of a standard size, say four feet long and two feet wide, and to mould holes in these slabs near each corner, say three inches from the sides to receive the locating bolts or the like. Each slab should be thin, and only of sufficient thickness to give it the necessary strength, a convenient thickness being 1.5 inch. The slabs are moulded in a machine or by hand with reinforcement of wire mesh or any other suitable reinforcing material, and sometimes with a few hooks, loops or the like attached to the reinforcement and projecting from the surface of each slab for embedding in the concrete filling at a later stage.

For securing the slabs together at the corners plates are provided with adjustable means for supporting them from the tubular scaffolding and with holes in them suitably placed to receive bolts or pins which will engage with the holes formed in the concrete slabs. Metal plates nine inches square are suitable, with holes near the corners to receive the bolts or the like for engaging in the holes in the slabs. The centre of each plate is provided with a projecting stem which may be directly secured to the scaffolding by suitable couplers, or it may be screw-threaded for example for engagement by a right-and-left threaded screw coupler, the other end of which screws on the end of a strut supported by a clamp on one of the tubes of the scaffolding.

In making up the shuttering the concrete slabs are arranged in rows and supported at their corners by bolts or projections on the plates entering the holes in the slabs, while in the case of a wall, the slabs at each side are kept spaced apart by suitable distance pieces, and then the gap between the slabs is filled up with concrete. When this has set the plates and couplers can be removed and used to support another set of slabs arranged as shuttering for the next run of concrete. In the case of floor and roof structures the plates and couplers are used to support the slabs from tubular scaffolding beneath the floor or roof, and if this latter is to be supported from a steel structure the wire mesh reinforcement may be arranged to project from the slabs and to be bent over the flanges of the steel joists before the concrete is applied over the slabs and between the joists. If a reinforced concrete floor or roof is to be made, the slabs may be provided with bent wire hooks to connect them to the reinforcing rods of the floor or roof structure before the concrete is laid.

Various forms of distance pieces may be used to space apart the slabs on each side of a wall and to assist in uniting them when the concrete is filled in. Tubular distance pieces may be used held up by the bolts in the corners of the plates until the concrete is filled in, and left in place when the plates are removed. Except in the case of very thick walls it suffices to have scaffolding on one side only of the structure, and to rely on the distance pieces to hold up the plates and slabs at the other side. Where necessary also the distance pieces can be replaced by rods or tubes with hooked ends to engage over cross ties in a wall for holding the plates and slabs where walls meet for example, or where piers are provided, and where there are slabs and supporting plates only on one side of the wall.

These and other features of the invention will now be described with reference to the accompanying drawings which illustrate various examples of constructions according to the invention. In these drawings:—

Figure 1 is a face view of part of a wall, and

Figure 2 is a cross section thereof;

Figure 3 shows in section the slabs and plates with distance pieces arranged to receive the filling of concrete;

Figure 4 is a face view of one form of plate;

Figure 5 is a face view of another form of the plate;

Figure 6 shows this plate in section through two of the bolt holes and shows a type of swivel coupler which may be used to support it on the scaffolding;

Figure 7 shows in section an arrangement of the slabs and tie rods for use with scaffolding at one side only of the wall;

Figure 8 is a similar sectional view showing the form of tie rods which may be used when the scaffolding is arranged at both sides of the wall;

Figure 9 is a similar sectional view showing another construction for use with scaffolding at one side only of the wall;

Figure 10 is a sectional view to illustrate the arrangement of the supporting plates and slabs in connection with a floor or roof made with steel joists;

Figure 11 is a similar sectional view showing the arrangement of the supporting plates and slabs in connection with a reinforced concrete floor or roof structure;

Figure 12 is an isometric view illustrating a stage in the construction of a wall when using supporting plates on one side of the types shown in Figures 5 and 6;

Figure 13 is a diagram showing the way in which the slabs may be supported at an intersection between two walls;

Figure 14 is a similar diagram showing how the slabs may be supported at a corner in the walls;

Figure 15 is a diagram showing part of the wall with a window opening therein;

Referring first to Figures 1 and 2, a wall as made according to this invention consists of slabs such as 20 on each side with a filling of concrete 21 between them, and generally with tie rods, distance pieces and so forth between the slabs as hereinafter more fully described. Each slab has holes as at 22 near its corners which are used for locating it during construction and may afterwards be filled up with cement or any suitable stopping.

Figure 3 shows one arrangement of the slabs and supporting members for building a wall when there is tubular scaffolding erected at both sides thereof. 23 represents one of the tubes of the scaffolding with a clip or clamp 24 secured to it holding a screw bolt 25 which, with another bolt 27 and a right-and-lefthand threaded coupler 26 forms an adjustable strut. The head of bolt 27 engages in a slot in a bracket 28 formed on a plate 29 which has threaded holes near each corner to receive screw studs 30. These studs in this example of construction merely serves to locate the corners of the slabs 20 where they meet in the successive rows, the position of one of the plates 29 being indicated for example in dotted lines in Figure 1 over one of these meeting corners. The slabs 20 forming the two slides of the wall are spaced apart in the example of construction shown in Figure 3 by rods 31 with collars 32 formed, shrunk or otherwise applied to them at each end, the projecting ends of the rods beyond the collars being preferably made ragged or irregular as indicated at 33 to form a key with cement introduced into the holes at 22 when the supporting plates have been removed.

The slabs may be of any convenient size, but a suitable size has been found to be four feet long by 2 feet wide. Their edges are preferably slightly chamfered or bevelled as indicated in Figure 3 to allow the concrete filling to penetrate between them, but this is not essential.

In building a wall by the method indicated in Figure 3 the slabs 20 are arranged with the distance pieces 31 between them, and supported from the tubular scaffolding at each side by the couplers 25, 26, 27, and the plates 29, the couplers being adjusted in relation to the scaffolding until all the slabs are vertical with their top and bottom edges horizontal, and the slabs at the sides of the wall are at the correct distance apart. The slotted engagement of the screw bolts 27 with the brackets 28 in plates 29 enables the plates to be adjusted in height in relation to the scaffolding when required so that the plates may be in a vertical position if the scaffold members 23 are not exactly at the correct height in relation to the joints between the slabs. When say two or three rows of slabs have been erected and adjusted in position concrete is filled in between them and as soon as this has set the couplings 26 are slackened or the bolts 30 screwed back until the plates are free from the slabs, and the plates and couplers are used again to support another row of slabs at a higher level in extending the wall upwards. The holes at 22 when exposed are filled in with cement or other suitable filling to leave a wall having the external appearance indicated in Figure 1.

It is not found to be essential to use plates and couplers as illustrated in Figures 3 and 4 and a simpler form of plate and coupler may be used as illustrated in Figures 5 and 6. In this case the plate is numbered 34 and the screw studs near the corners thereof are

numbered 30 as before. The plate 34 simply has a tubular stem 35 united to it at right angles by a run of welding as at 36, and the stem is supported from the members of the scaffolding 23 by swivel couplers or clips 37 of a known type which provide for considerable adjustment in the relative positions of the plates 34 and the scaffolding members from which they are supported.

Figure 7 shows a construction in which the slabs are supported from scaffolding only at one side. The construction corresponds with that of Figure 3 except that in place of rods 31 with ragged ends, the distance pieces are formed by rods 38 with collars 39, the ends of the rods projecting beyond the collars being threaded as at 40 for engagement within threaded sockets in the screw studs 41 engaging in the holes in the plates 29 and 42. The plates 29 at the lefthand side are shown in this case supported by screw couplers from scaffolding 23, all that is required at the other side being rectangular plates 42 with holes in the corners to receive the screw studs 41. The studs 41 may either be threaded so as to engage simultaneously with the threaded ends 40 of the rods 38, or the studs may be mounted to turn without screwing in the plates 29 and 42 so that their only screw engagement is with the threaded ends 40. Whichever arrangement is adopted the studs are screwed back after the concrete has been filled in so as to enable the plates 29 and 42 to be removed and the holes at 22 in the slabs are filled in with cement or otherwise which will set around the threaded ends of the rods.

Figure 8 shows a construction of a wall with the use of plates 34 at both sides of the type shown in Figures 5 and 6, and with rods 31 having collars 32 as in Figure 3.

Figure 9 shows how this construction is modified when there is scaffolding on one side of the wall only. The plates 34, supported from the scaffolding by their projecting tubular stems 35 have screw studs 43 in their corners screwing into the threaded ends of tubular distance pieces 44. These distance pieces are slotted transversely near their ends to receive pins or wedges 45 which pass through the slots and bear against the slabs at each side of the holes formed in them at 22 so that the slabs are held firmly between the pins 45 and the plates 34 on one side, and between the pins 45 and the plates 42 at the other side where there is no scaffolding support. Of course collars can be used if preferred instead of the cross pins 45.

Figures 10 and 11 show how the plates and slabs are used in making a concrete floor or roof. In Figure 10 the slabs 20 are shown held up against the base of a girder or joist 46 by means of plates 34 with studs 43 at the corners. In this case the slabs are moulded with their reinforcement of wire mesh or the like projecting near the ends as at 47 from their inner faces so that this reinforcement can be bent over the flanges of the joists 46 and will key the slabs to the joists when the concrete is filled in between the joists and on top of the slabs.

In the construction of Figure 11 it is assumed that the floor on top of the slabs will be of reinforced concrete, and in this case the slabs 20 when formed have wire hooks partially embedded in them near their ends as at 48 for engagement over reinforcing rods 49 which will be embedded in the concrete when laid over the slabs 20.

Figure 12 is an isometric view of a portion of a wall in course of erection with slabs 20 supported by plates 34 from the one side connected to scaffolding and to plates 42 at the other side held up by tubular distance pieces 44 as in Figure 9. As the concrete sets between the slabs below, the plates 34 and 42 are removed and used to support slabs at a higher level for further runs of concreting.

Figure 13 illustrates how, when the invention is employed, the slabs may be arranged and supported at an intersection between two walls. It is assumed that the scaffolding is internal in the structure in this case, and that plates 34 and 42 are used of the type shown in Figure 9, with tubular distance pieces between them. Where there is no plate at the other side the tubular distance pieces are made with hooked ends as at 50 to engage with the distance pieces 44 in the nearest adjacent section of the construction. In this case a narrow slab 51 is shown opposite the end of the intersecting wall between adjacent slabs 20, and held up by the distance piece with a hooked end 50, but this is not essential for construction.

Figure 14 shows one arrangement of the slabs and plates at a corner of a building when internal scaffolding only is used. Here again narrow slabs 51 are inserted at the corners and held up by distance pieces with hooked ends 50 engaging over adjacent distance pieces 44.

In building up walls wherever window and door frames and the like have to be introduced, they may be made up from concrete mouldings inserted between the slabs. For example Figure 15 shows part of a wall with inserted mouldings 54 to receive a window frame, these being introduced between the slabs when the wall is being made, with the use of shorter

and narrower slabs such as 55, 56, 57 and 58 where required to allow for the height and width of the window opening desired.

The slabs may be made with any suitable concrete such as gravel, breeze, or foam slag and any suitable form of reinforcement may be used in them. A suitable thickness, as already mentioned, is one and a half inches, but thicker slabs can be used if required. The slabs are preferably left with a rough surface both inside and out to enable them to unite better with the concrete filling on the one hand and to form a good surface to receive plastering, roughcast or other finish on the exposed wall surface. By spacing the slabs to the desired distance walls of any thickness can be made from a minimum thickness which leaves sufficient spacing between the slabs to introduce the concrete filling.

It is well known of course to build up walls of concrete blocks laid on one another inside and outside, with or without ties between them, and to fill the intervening space with concrete. The present invention differs from this in that comparatively thin slabs are used, each forming a substantial area of the wall surface and requiring external support to maintain it in position and internal means for insuring the proper spacing between the slabs at the two sides of the wall or the like. The slabs in fact act like shuttering rather than as moulded blocks, but the shuttering forms a permanent part of the structure in this case. As the slabs are themselves reinforced internally they add strength to the structure as a whole. Of course additional reinforcement may be introduced in the space between the slabs at the two sides of the wall, if this is required.

Although rectangular metal plates have been described for supporting purposes with slots near to each corner for receiving the studs which pass through the holes in the slabs, it will be understood that the plates may be in the form of discs with the necessary spaced holes, or any other form which enables the corners of the slabs to be supported and the bolts or the like to be secured in position.

When pipes or flues are to be formed in the walls, lengths of metal or stoneware piping can be introduced between holes in the slabs before the concrete is filled in, and smoke flues of terra-cotta or the like can similarly be embedded in the concrete. Ventilator gratings can be cast in the slabs and openings left between them in the walls by insertion of suitable pre-formed box-like blocks before filling in the concrete.

When some of the studs such as 30 or 43 are not required as at angles in the walls or round window openings in a structure, these studs are simply screwed back or removed. This is shown on various of the plates supporting the slabs in Figures 13, 14 and 15 for example.

Proposals have already been made to construct walls with pre-cast slabs inside and outside, the slabs being of such a thickness that they will stand one on another while they are spaced apart by distance tubes and screw connections, the outer slabs being held in position by upright stanchions with clamping elements connecting them to the slabs. I make no claim to any such construction. It is an essential feature of my invention that the pre-cast slabs should be thin so that they are not self-supporting when stood on edge, and that they should be held in place from ordinary tubular scaffolding through adjustable means of support carrying plates which have members for engaging with holes in the slabs near to their corners, so that one such plate may form a corner support for all the slabs meeting at a corner. The adjustable means of connection enable the plates and slabs to be truly aligned in a vertical or horizontal plane, and the method of construction is such that most of the work can be done by unskilled labour.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A method of erecting concrete walls, floors and the like according to which preformed concrete slabs, which are comparatively thin and not self-supporting when stood on edge, are used in place of shuttering and are held in place from tubular scaffolding through adjustable means of support carrying plates which have members for engaging with holes in the slabs near to their corners, so that one such plate may form a corner support for all the slabs meeting at a corner, the slabs so supported being maintained in the required positions to form the inner and outer faces of walls, or the under faces of floors, and to receive and support the filling of concrete, such slabs being left to form the facings of the structures after the concrete has set and when the support from the scaffolding has been removed.

2. A method of erecting concrete walls and the like according to which preformed concrete slabs, which are comparatively thin and not self-supporting when stood on edge, are used in place of shuttering at both sides of the wall or the like, the slabs being held in place from tubular scaffolding erected at one or both sides of the wall

or the like through adjustable means of support carrying plates which have members for engaging with holes in the slabs near to their corners, so that one such plate may form a corner support for all the slabs meeting at a corner, together with members spacing the slabs apart at the inner and outer faces to the required distance to receive the filling of concrete between them, the slabs being left to form the permanent surfaces of the wall or the like after the support from the scaffolding has been removed.

3. Walls, floors or similar structures when made by the method of claim 1 or claim 2 with the use of concrete slabs in place of shuttering to form the faces of the walls or the under faces of floors and the like, substantially as described with reference to Figures 1 and 2 or to Figures 10, 11 or 12 of the accompanying drawings.

4. An assemblage of supporting plates, concrete slabs and distance pieces or connecting rods for use in erecting a wall or the like, substantially as described with reference to Figure 3, Figure 7, Figure 8, Figure 9 or Figure 12 of the accompanying drawings.

5. An assemblage of supporting plates, concrete slabs and means for uniting such slabs to joists or reinforcement in a concrete floor structure, substantially as described with reference to Figure 10 or to Figure 11 of the accompanying drawings.

Dated this 25th day of January, 1943.

For the Applicant:
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51/52, Chancery Lane, London, W.C.2.

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558,239 COMPLETE SPECIFICATION

SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

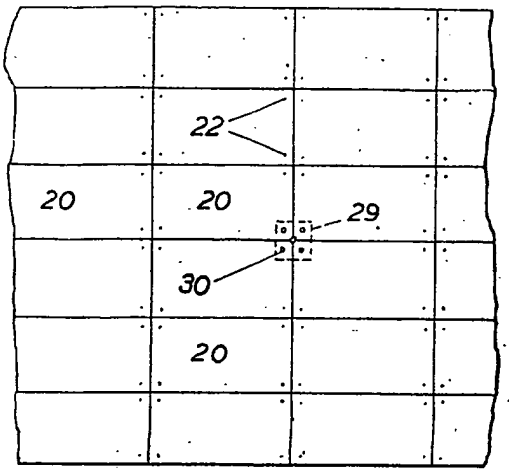


FIG. 2.

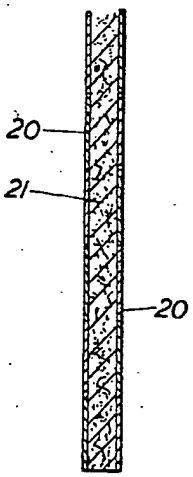


FIG. 4.

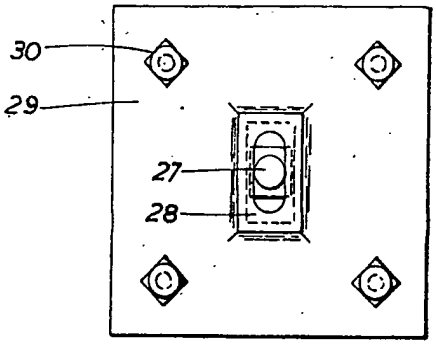


FIG. 5.

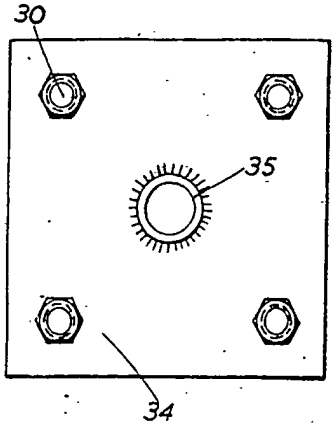
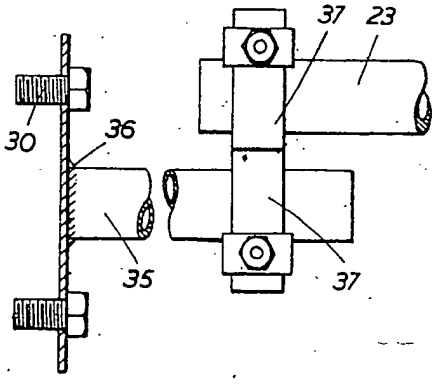


FIG. 6.



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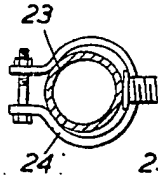

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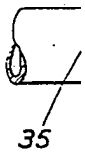

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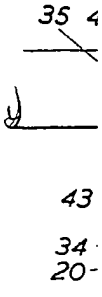

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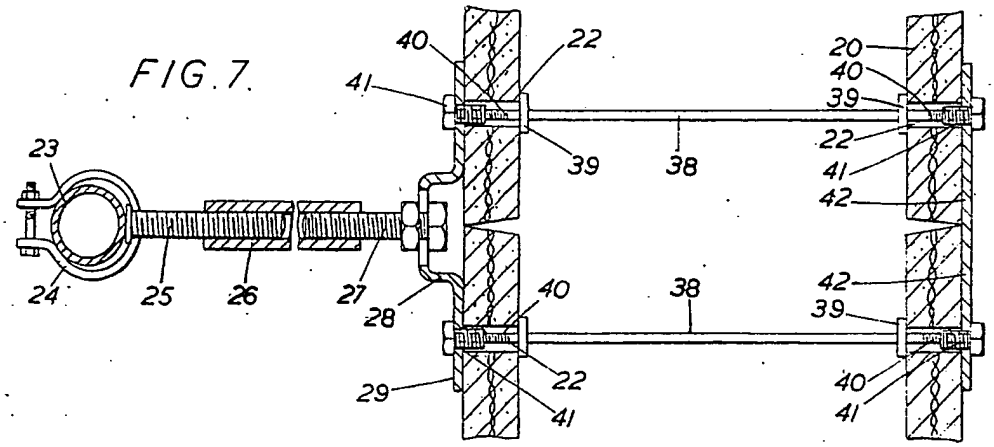

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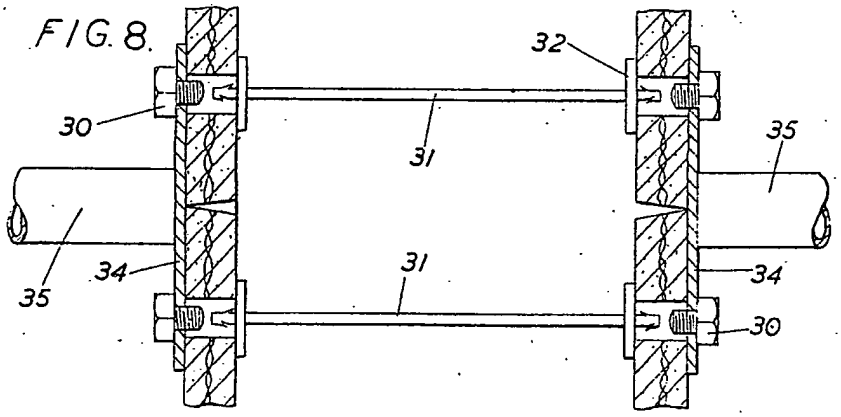
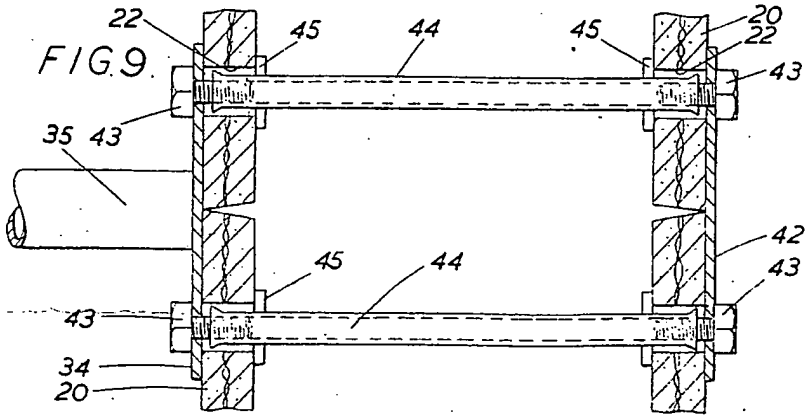


FIG. 9.



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7 SHEETS

SHEET 1

FIG. 1.

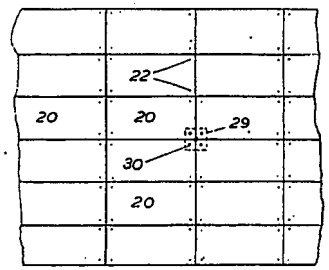
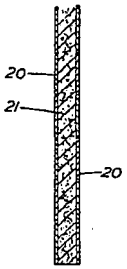


FIG. 2.



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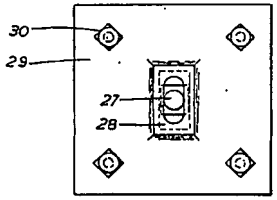


FIG. 5.

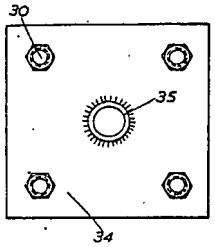
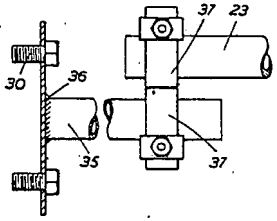


FIG. 6.



[This Drawing is a reproduction of the Original on a reduced scale.]

SHEET 3

FIG. 7.

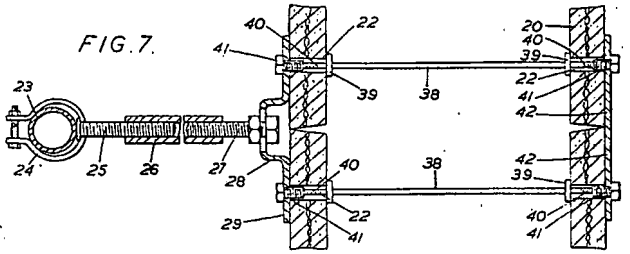


FIG. 8.

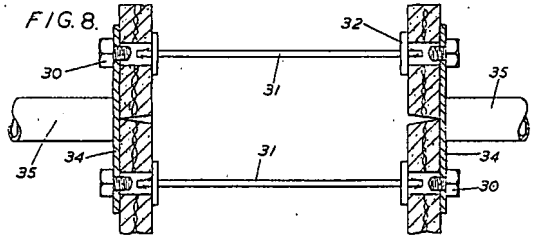
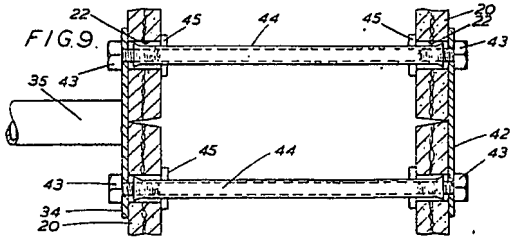


FIG. 9.



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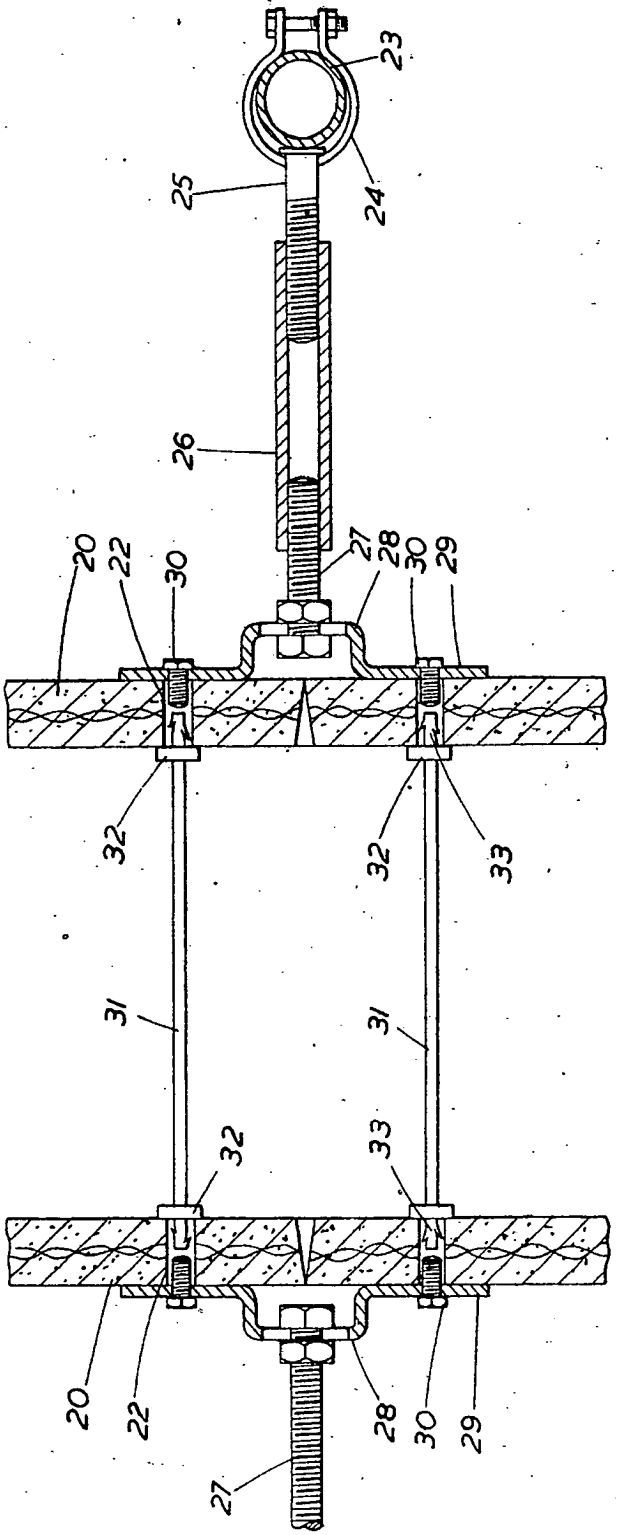

FIG. 3.

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FIG.10.

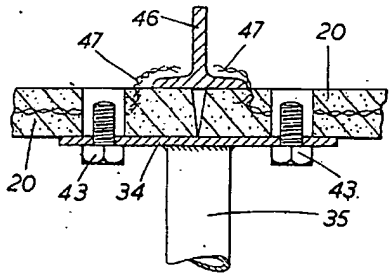


FIG.11.

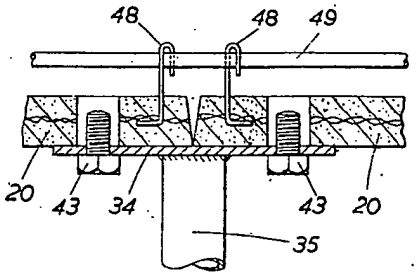
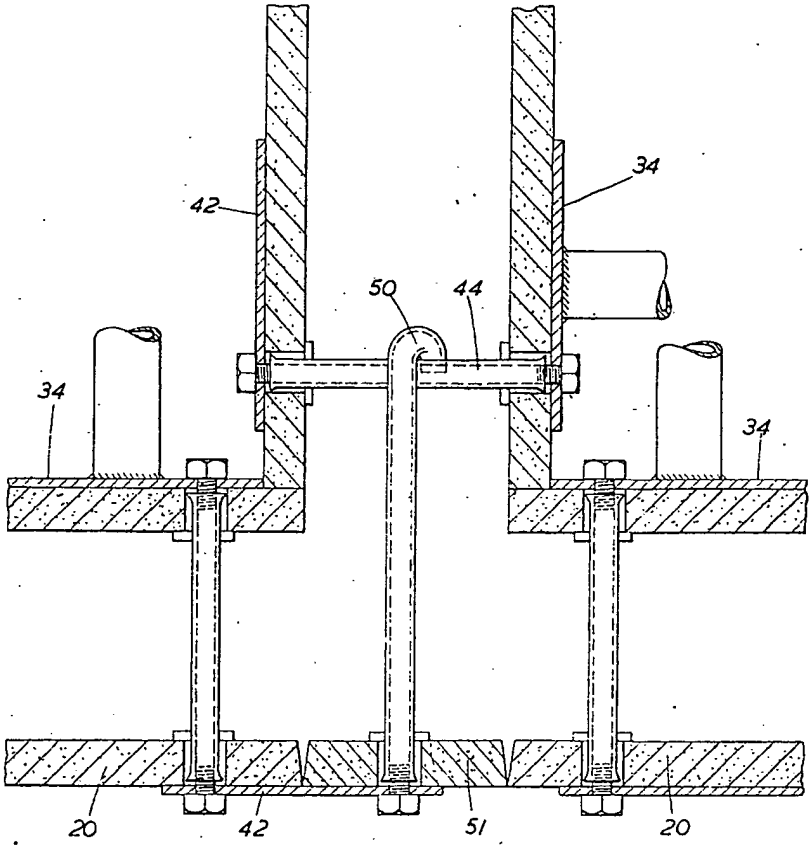


FIG.13.



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7 SHEETS

SHEET 4

20

34

20

SHEET 6

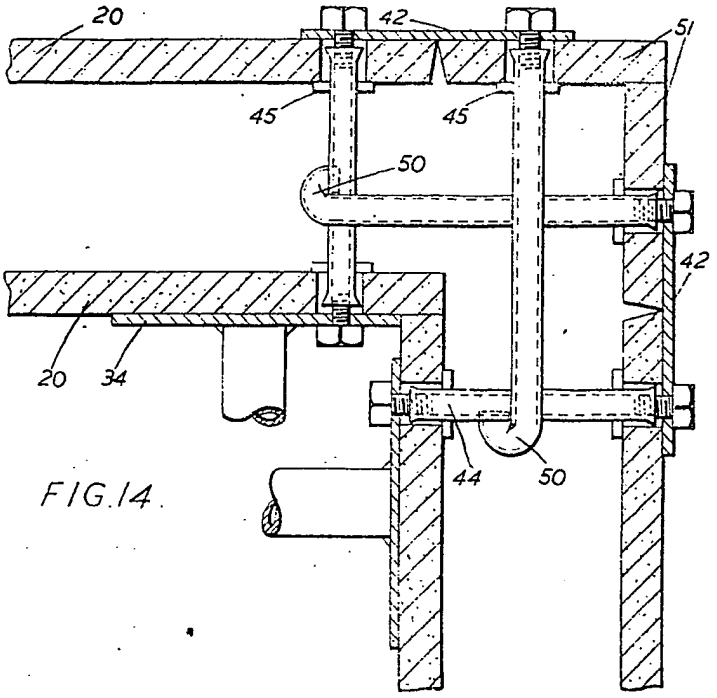
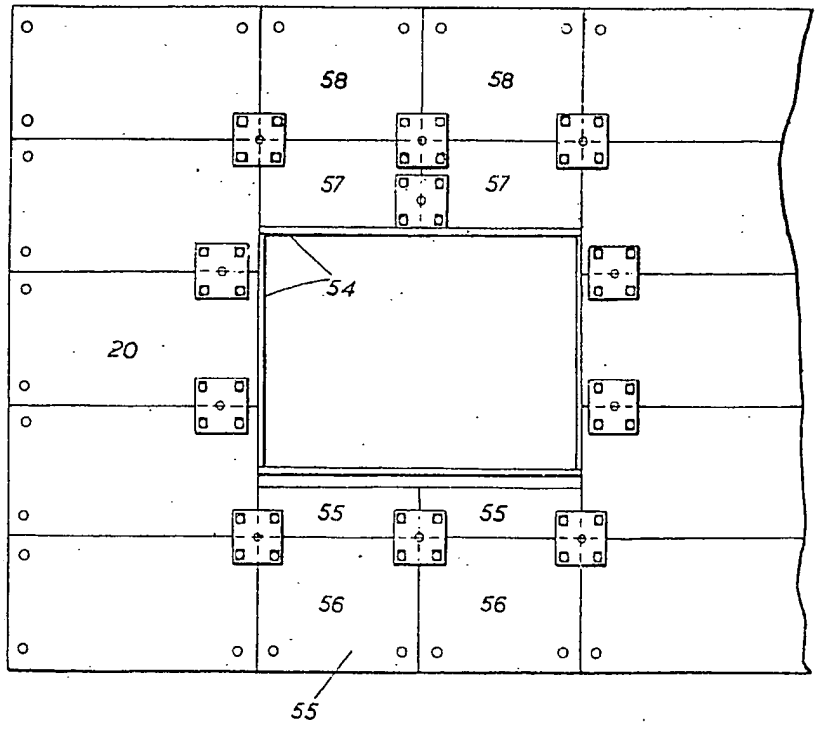


FIG. 14.

SHEET 7

FIG. 15.



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7 SHEETS

SHEET 4

FIG. 10.

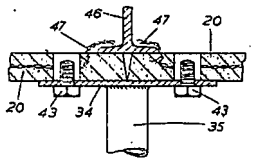


FIG. 11

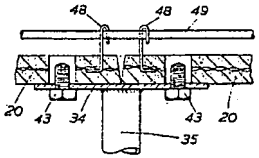
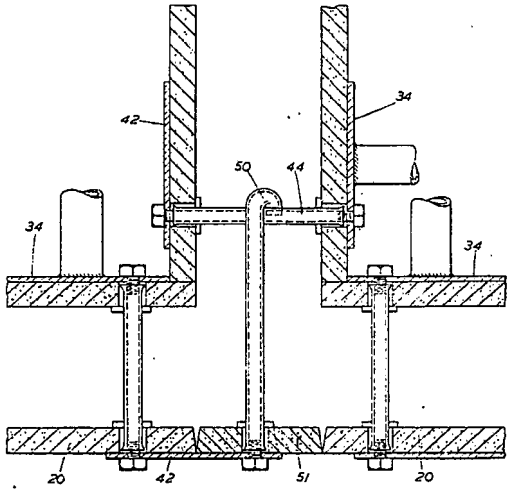


FIG. 13.



SHEET 6

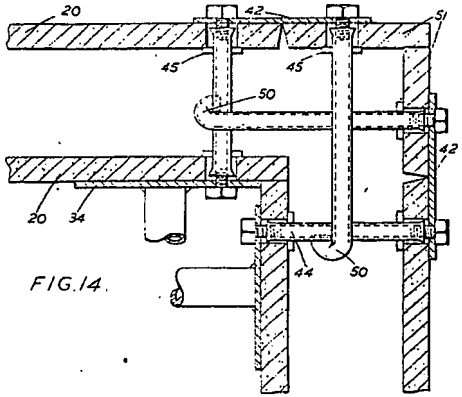
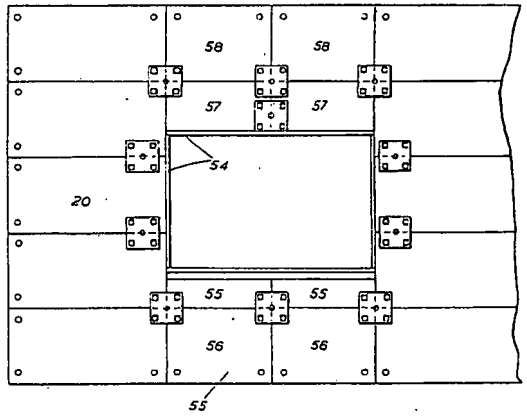


FIG. 14.

SHEET 7

FIG. 15.



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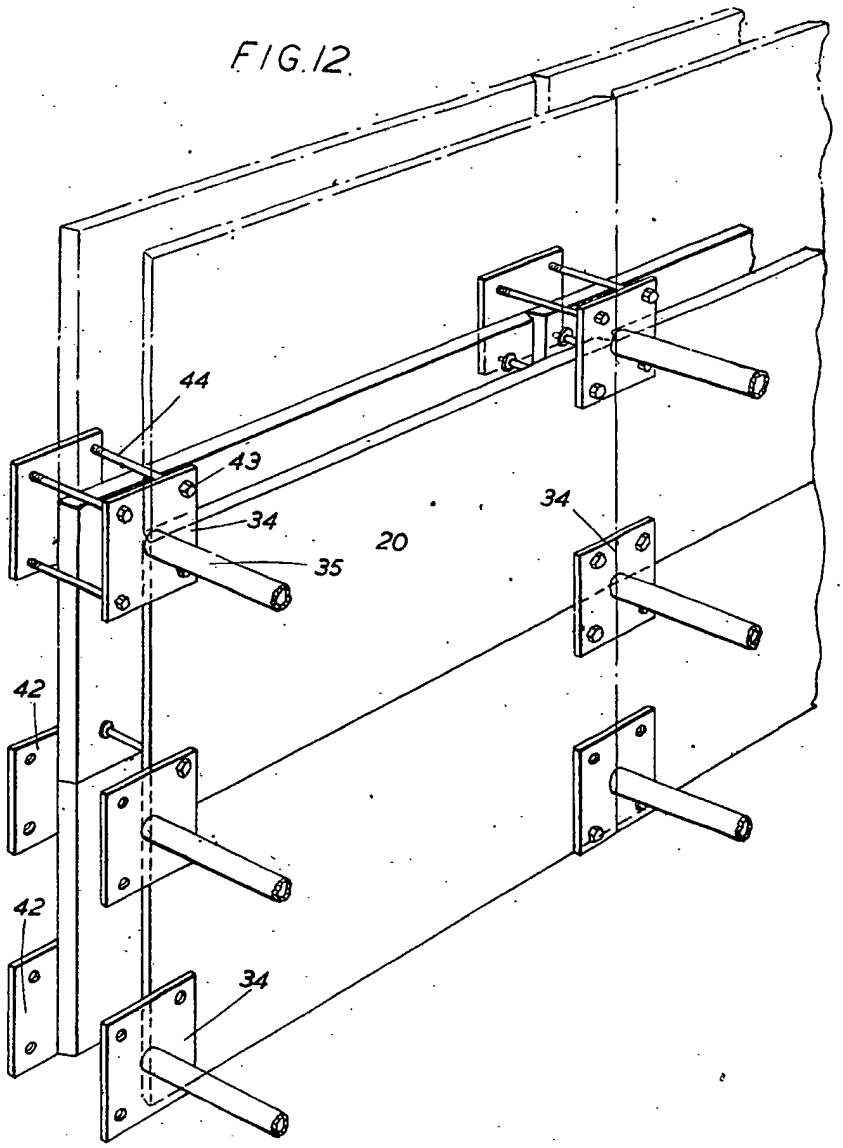
[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 12.



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